# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/663,775 | 09/18/2000 | Darren Kerr | 112025-0196 | 4073 |

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CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

| EXAMINER |
|---|
| VO, LILIAN |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2127 | |

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

| | **Application No.** | **Applicant(s)** |
|---|---|---|
| **Office Action Summary** | 09/663,775 | KERR ET AL. |
| | **Examiner** | **Art Unit** | |
| | Lilian Vo | 2127 | |

*-- The MAILING DATE of this communication appears on th  cover she  t with the correspondenc  address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on _18 September 2000_.

2a)☐ This action is **FINAL**.       2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _1-20_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-20_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _18 September 2000_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)      4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)      5)☐ Notice of Informal Patent Application (PTO-152)

3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _3_ .      6)☐ Other: .

## DETAILED ACTION

1.      Claims 1 – 20 are pending.

### *Claim Rejections - 35 USC § 112*

2.      The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3.      Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

   **Claim 3** recites the limitation "wherein the step of generating" in page 20, line 1. There is insufficient antecedent basis for this limitation in the claim.

### *Claim Rejections - 35 USC § 102*

4.      The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5.      Claims 1, 2, 4, 5 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Key et al (US 6,272,621 B1, hereafter referred to Key).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding **claim 1**, Key discloses a method for enabling out-of-order processing of contexts by processors of a multi-processor system, the processors arrayed as a plurality of clusters embedded between input and output buffers (col. 6, lines 12 – 48, col. 8, lines 6 – 34), the method comprising the steps of:

assigning each context a queue identifier (ID) and a sequence number, the queue ID uniquely identifying a flow of the context and the sequence number denoting an order of the context within the flow (col. 7, lines 10 – 52);

distributing the contexts from the input buffer to the clusters buffers (col. 6, lines 12 – 48, col. 7, lines 10 – 52 and col. 8, lines 6 – 34);

allowing out-of-order context processing among the clusters for contexts having different queue Ids (col. 9, line 58 – col. 10, line 13, lines 34 – 56 and fig. 7); and

enforcing first in, first out (FIFO) synchronization context processing among the clusters for contexts having the same queue ID (col. 9, line 58 – col. 10, line 13).

Regarding **claim 2**, Key discloses the method of claim 1 wherein the step of assigning comprises the step of deriving the queue ID using information that enables identification of dependencies among the contexts (col. 7, lines 10 – 52, col. 9, line 58 – col. 10, line 13).

Regarding **claim 4**, the method of claim 1 wherein the step of assigning comprises the step of incrementing a predetermined value to generate the sequence number (col. 6, lines 34 – 48, col. 9, line 67 – col. 10, line 33).

Regarding **claim 5**, Key discloses the method of claim I further comprising the step of coupling an input sequence controller to the input buffer and an output sequence controller to the output buffer (col. 10, line 34 – col. 11, line 19, col. 12, line 40 – col. 13, line 37, figs. 7 and 9).

**Claim 17** is rejected on the same ground as claim 1 above.

6.     Claims 1 - 4, 13 an 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Iadonato et al (US Pat. Application Publication 2002/0053014 A1, hereafter referred to Iadonato).

Regarding **claim 1**, Iadonato discloses a method for enabling out-of-order processing of contexts by processors of a multi-processor system, the processors arrayed as a plurality of clusters embedded between input and output buffers (page 1, paragraphs 0010, 0011), the method comprising the steps of:

assigning each context a queue identifier (ID) and a sequence number, the queue ID uniquely identifying a flow of the context and the sequence number denoting an order of the context within the flow (abstract, page 1, paragraph 0020);

distributing the contexts from the input buffer to the clusters buffers (abstract);

allowing out-of-order context processing among the clusters for contexts having different queue Ids (abstract, page 2, paragraph 0019, page 3, paragraph 0041); and

enforcing first in, first out (FIFO) synchronization context processing among the clusters

for contexts having the same queue ID (abstract, page 2, paragraph 0019, page 3, paragraph

0041, page 4, paragraph 0053).

Regarding **claim 2**, Key discloses the method of claim 1 wherein the step of assigning

comprises the step of deriving the queue ID using information that enables identification of

dependencies among the contexts (abstract, page 1, paragraph 0020, page 3, paragraph 0027).

Regarding **claim 3**, Iadonato discloses of mapping the executed instructions to their

corresponding assigned tags and addresses inherently teach the step of transforming flow

parameters of a context to the queue ID in accordance with a hash function (abstract, page 2,

paragraph 0010, page 3, paragraph 0025, 0046, page 5, paragraph 0071).

Regarding **claim 4**, the method of claim 1 wherein the step of assigning comprises the

step of incrementing a predetermined value to generate the sequence number (page 1, paragraph

0005).

Regarding **claim 13**, Iadonato discloses an apparatus for enabling out-of-order processing

of contexts by processors of a processing engine, the processors arrayed as a plurality of clusters,

the apparatus comprising:

a hash function adapted to transform flow parameters of a context to a queue identifier

(ID) that uniquely identifies a flow of the context (abstract, page 2, paragraph 0010, page 3,

paragraph 0025, 0046, page 5, paragraph 0071);

an incrementor coupled to the hash function and configured to increment a predetermined

value to generate a sequence number denoting an order of the context within the flow (abstract,

page 1, paragraph 0005);

an input buffer of the processing engine coupled to the hash function and incrementor,
the input buffer distributing the contexts to the clusters (abstract, page 2, paragraph 0019, page 3,
paragraph 0041, page 4, paragraph 0053); and

a sequence control mechanism that allows out-of-order context processing among the
clusters for contexts having different queue Ids and enforces first in, first out (FIFO)
synchronization context processing among the clusters for contexts having the same queue ID
(abstract, page 2, paragraph 0019, page 3, paragraph 0041, page 4, paragraph 0053).

**Claim 17** is rejected on the same ground as claim 1 above.

### *Claim Rejections - 35 USC § 103*

7.     The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all
obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

8.     Claims 5 – 12, 14 – 16, and 18 – 20 are rejected under 35 U.S.C. 103(a) as being
unpatentable over Iadonato et al (US Pat. Application Publication 2002/0053014 A1, hereafter
referred to Iadonato) in view of Mesnil et al. (US 3,923,139, hereafter referred to Mesnil).

Regarding **claim 5**, Iadonato discloses a control logic coupling to the input and output
buffers (fig. 2) except he did not clearly show the step of coupling an input sequence controller
to the input buffer and an output sequence controller to the output buffer. Nevertheless, Mesnil
discloses the step of coupling an input sequence controller to the input buffer and an output
sequence controller to the output buffer (figs. 2, 8, 9 and col. 6, lines 32 – 47, col. 9, lines 12 –

21). Therefore, it would have been obvious for one of ordinary skill in the art, at the time the invention was made to incorporate this feature to Iadonato's system to have a separate sequence controller for input and out buffer to efficiently utilize the sequence control means for the ordering of the input and the output processing.

Regarding **claim 6**, Iadonato discloses of the kind of data structure that maintains in the flow of the system (page 2, paragraph 0020 and page 4, paragraph 0053) except he did not teach the step of interconnecting the input and output sequence controllers. Nevertheless, Mesnil discloses input sequence controller is interconnected to output sequence controller (fig. 8). Therefore, it would have been obvious for one of ordinary skill in the art, at the time the invention was made to incorporate this feature to Iadonato's system to efficiently utilize the sequence control means for the ordering of the input and output data structure.

Regarding **claim 7**, Iadonato discloses the method of claim 6 wherein the data structure is a content addressable memory (CAM) having a plurality of entries (page 2, paragraph 0020, 0022 and 0023).

Regarding **claim 8**, Iadonato discloses the method of claim 6 further comprising the step of providing a queue field and a minimum sequence field within each entry of the data structure (abstract).

Regarding **claim 9**, Iadonato discloses the method of claim 8 further comprising the step of executing an input function to update the data structure with the sequence number and queue ID associated with a new context (abstract, page 2, paragraph 0010, page 3, paragraph 0025, 0046, page 5, paragraph 0071, fig. 3).

Regarding **claim 10**, Iadonato discloses the method of claim 9 wherein the step of

updating comprises the steps of:

storing the queue ID in the queue field of an appropriate entry (abstract, page 2,

paragraph 0010, page 3, paragraph 0025, 0046, page 5, paragraph 0071); and

storing a lowest sequence number of a context for a flow that is active in the system in

the minimum sequence field of the entry (abstract, page 2, paragraph 0010, page 3, paragraph

0025, 0046, page 5, paragraph 0071, fig. 2).

Regarding **claim 11**, Iadonato discloses of the assigning and storing tags to instructions

and tags are orderly arranged in the queue (abstract). Therefore, it would have been obvious for

one of ordinary skill in the art, at the time the invention was made to recognize that the minimum

sequence field is also the sequence number of the first or the lowest order of the instruction in the

queue.

Regarding **claim 12**, Iadonato discloses the method of claim 8 further comprising the step

of executing an output function to validate one of the out-of-order processing and FIFO

synchronization processing of the contexts (page 2, paragraph 0010, page 3, paragraph 0025,

0046).

**Claim 14** is rejected on the same ground as claim 5 above.

**Claim 15** is rejected on the same ground as claim 6 above.

Regarding **claim 16**, the apparatus of claim 15 wherein the data structure is a content

addressable memory (CAM) having a plurality of entries, each entry including a queue field that

stores the queue ID of a context and a minimum sequence field that stores a lowest sequence

number of a context for a flow that is active in the engine (abstract, page 2, paragraph 0010,

0020, 0022 and 0023, page 3, paragraph 0025, 0046, page 5, paragraph 0071).

Regarding claim 18, Iadonato discloses the input function updating a data structure with

the sequence number and queue ID associated with a new context (abstract, page 2, paragraph

0010, page 3, paragraph 0025, 0046, page 5, paragraph 0071, fig. 3), and the kind of data

structure that maintains in the flow of the system (page 2, paragraph 0020 and page 4, paragraph

0053). He did not clearly show the step of coupling an input sequence controller to the input

buffer. Nevertheless, Mesnil discloses the step of coupling an input sequence controller to the

input buffer (figs. 2, 8, 9 and col. 6, lines 32 – 47, col. 9, lines 12 – 21). Therefore, it would have

been obvious for one of ordinary skill in the art, at the time the invention was made to

incorporate this feature to Iadonato's system to have a separate sequence controller for input and

output buffer to efficiently utilize the sequence control means for the ordering of the input and

the output processing.

Claim 19 is rejected on the same ground as claim 12 above.

Regarding claim 20, Iadonato discloses a method of enabling out-of-order processing of

contexts by processors of a multiprocessor system, the processors arrayed as a plurality of

clusters embedded between put and output buffers (abstract), the method comprising the steps of:

assigning each context a queue identifier (ID) and a sequence number, the queue ID

uniquely identifying a flow of the context and the sequence number denoting an order of the

context within the flow (abstract, page 1, paragraph 0020);

providing the queue ID and sequence number to the input buffer (abstract, page 2,

paragraph 0010, page 3, paragraph 0025, 0046, page 5, paragraph 0071, fig. 3);

updating a data structure with the queue ID and sequence number, the data structure

maintaining a list of active flows in the system (abstract, page 2, paragraph 0010, 0020, page 3,

paragraph 0025, 0046, page 5, paragraph 0071, page 4, paragraph 0053 fig. 3);

processing the context at the processors of the cluster (abstract);

at the output buffer allowing one of out-of-order processing and first in, first out

synchronization processing of the context depending upon the queue ID and sequence number of

the context (abstract, page 2, paragraph 0019, page 3, paragraph 0041, page 4, paragraph 0053).

Iadonato discloses a control logic coupling to the input and output buffers (fig. 2) except

he did not clearly show the step of coupling an input sequence controller to the input buffer and

an output sequence controller to the output buffer. Nevertheless, Mesnil discloses the step of

coupling an input sequence controller to the input buffer and an output sequence controller to the

output buffer (figs. 2, 8, 9 and col. 6, lines 32 – 47, col. 9, lines 12 – 21). Therefore, it would

have been obvious for one of ordinary skill in the art, at the time the invention was made to

incorporate this feature to Iadonato's system to have a separate sequence controller for input and

output buffer to efficiently utilize the sequence control means for the ordering of the input and

the output processing.

### *Conclusion*

9.     The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure. US Pat. Application Publication 2003/0140189 A1, US 6,101,599, US 6,513,108, US

6,173,386 B1, US 6,195,739 B1, US 6,061,785.

10.     Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Lilian Vo whose telephone number is 703-305-7864. The

examiner can normally be reached on Monday - Thursday, 7:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, William Grant can be reached on 703-308-1108. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703-305-3900.

Lilian Vo
Examiner
Art Unit 2127

lv
December 11, 2003

WILLIAM GRANT
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100
12/14/03